

#27

$$f(x) = 4 - \frac{1}{x}$$

$$f(x) = \frac{4x - 1}{x}$$

Vert. Asymptote  $\Rightarrow x = 0$

Horizontal Asymp.  $\Rightarrow \frac{4}{1} \rightarrow y = 4$

$$x \rightarrow \infty \quad y \Rightarrow 4$$

$$x \rightarrow -\infty \quad y \Rightarrow 4$$

Sect. 2.6B

Sketch a graph for each problem by hand.

$$\textcircled{1} f(x) = \frac{3}{x-2}$$

$$\textcircled{2} f(x) = \frac{2x-1}{x}$$

$$\textcircled{3} f(x) = \frac{x}{x^2-x-2}$$

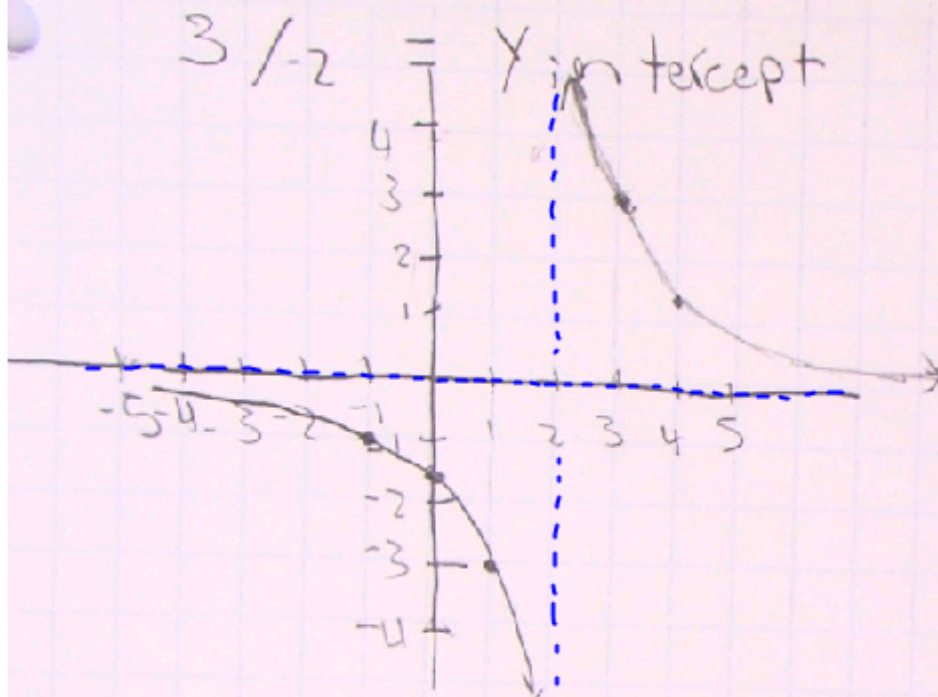
$$\textcircled{4} f(x) = \frac{x^2-9}{x^2-2x-3}$$

Guidelines for Graphingstep

- ① Simplify  $f(x)$  if possible
- ② Plug 0 in for  $x$  to find  $y$ -int
- ③ set the numerator equal to 0 and solve for  $x$ . This gives  $x$ -int.
- ④ set the denominator equal to 0 and solve for  $x$ . This give vertical asymptotes and domain restrictions
- ⑤ Use the 3 rules, p. 144 to find horizontal asymptotes.
- ⑥ Plot points to get shape of graph.

1.  $F(x) = \frac{3}{x} - 2$

$\frac{3}{-2}$  Y-intercept



Bottom Higher than top Horiz As = 0

~~2~~ No x intercepts  $3 \neq 0$

Horizontal Asymp @ 0

Vertical Asymp @ 2

when  $x=0$  y-int

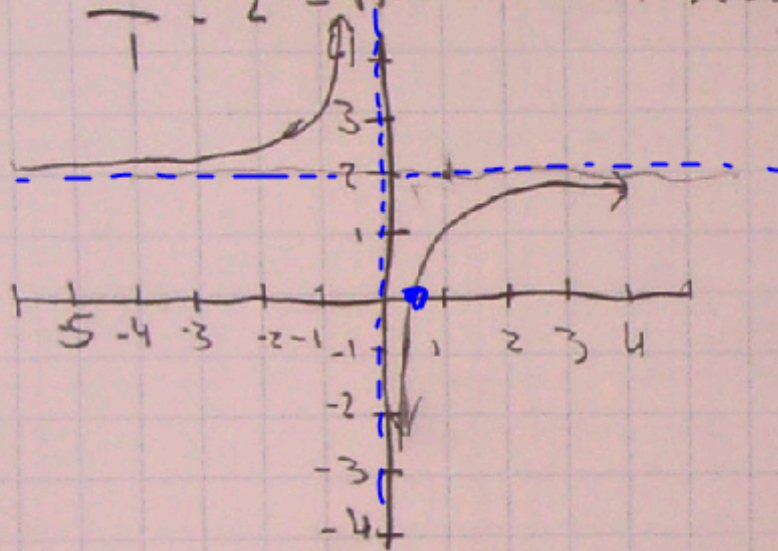
$$-\frac{3}{2}$$

2.  $f(x) = \frac{2x-1}{x}$      $2 - \frac{1}{x}$      $\frac{-1}{0}$     undefined    x intercept

$x=0$  is vertical Asymptote  
 $\frac{2}{1} = 2$  = Horizontal Asymptote

x-int  $2x-1=0$   
 $x = \frac{1}{2}$

y-int = None





③  $f(x) = \frac{x}{x^2 - x - 2} \rightarrow \frac{0}{0^2 - 0 - 2} = \frac{0}{-2} = 0 = y\text{-intercept}$

$y\text{-int at } (0,0)$

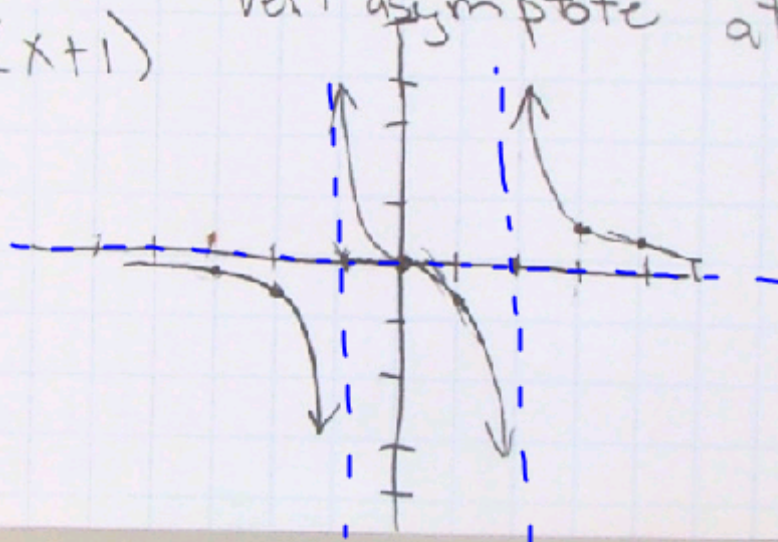
$$\frac{0}{x^2 - x - 2}$$

$$(x-2)(x+1)$$

Horiz asym @ 0  
vert asymptote at 2 and -1

$$x\text{-int} = 0$$

$$y\text{-int} = 0$$

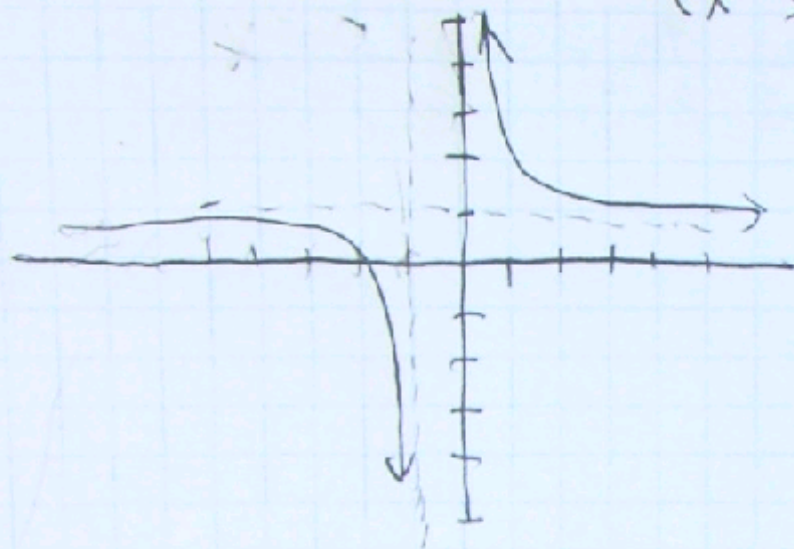


$$4. f(x) = \frac{x^2 - 9}{x^2 - 2x - 3}$$

Horiz asymp = 1

$$(x-3)(x+1)$$

because only at 3 it is simply undefined



## Homework

- Sect. 2.6 #31-35
- Sect. 2.7 Read and understand the section and examples.  
(slant Asymptotes)